

What is Claimed Is:

1. An airbag apparatus for a motorcycle for protecting a rider in the event of frontal collisions, the airbag apparatus comprising:
 - an airbag for being deployed in predetermined directions relative to
 - 5 movement of the rider due to frontal collisions; and
 - inflation control means for restricting inflation of the airbag in one of the directions that is generally aligned with the rider movement due to frontal collisions and allowing inflation of the airbag in another of the directions that is transverse to the one direction.
- 10 2. The airbag apparatus of claim 1 wherein the inflation control means comprises tethering means for connecting generally opposing portions of the airbag so as to restrict airbag inflation in the one direction.
- 15 3. The airbag apparatus of claim 1 wherein the inflation control means includes at least one tether that is connected to the airbag at an inflated airbag portion adjacent to the rider and which generally extends away from the rider in the one direction.
- 20 4. The airbag apparatus of claim 1 wherein the transverse direction is a generally vertical direction so that the airbag is allowed to inflate upwardly by the inflation control means for protecting the rider in the event of a pitching motion due to a frontal collision.
- 25 5. The airbag apparatus of claim 1 wherein the airbag has a predetermined inflated volume, and
 - an inflator sized to inflate the predetermined airbag volume with the inflation control means optimizing the inflated airbag volume extending in the transverse

direction for maximized rider protection while keeping the size of the inflator to a minimum.

6. The airbag apparatus of claim 1 wherein the airbag comprises a central panel
5 and side panels, and the inflation control means comprises a connector attached to
the central panel at one end and to either the central panel or the side panels at the
opposite end thereof.

7. The airbag apparatus of claim 1 wherein the inflation control means increases
10 rigidity of the airbag in the one direction over rigidity of the airbag in the other
direction.

8. The airbag apparatus of claim 1 wherein the inflation control means includes
a tether in the airbag that extends generally in a fore and aft direction as the airbag
15 is deployed.

9. The airbag apparatus of claim 1 wherein the inflation control means includes
a tether attached to the airbag at generally opposing forward and rearward portions
therein so that upon airbag deployment a recess is formed in the airbag adjacent the
20 rider.

10. The airbag apparatus of claim 1 wherein the inflation control means includes
a tether or tethers that are connected at predetermined positions in the airbag
including generally opposing forward and rearward positions.

25

11. The airbag apparatus of claim 10 wherein the rearward position is adjacent
the rider and the forward position includes a pair of connections on either side of the
airbag toward the forward side thereof.

12. The airbag apparatus of claim 10 wherein the predetermined positions includes a generally upper position.

13. An airbag apparatus for a motorcycle having front and rear wheels and a seat
5 for a rider spaced rearward of the front wheel, the airbag apparatus comprises:
an airbag for being deployed forwardly of the seat in the event of frontal
collisions;
at least one direction control member associated with the airbag to optimize
airbag inflation in a predetermined direction; and
10 a plurality of connections between the control member and the airbag that are
at predetermined positions on the airbag such that the predetermined direction is
transverse to generally forward movement of the rider caused by frontal collisions.

14. The airbag apparatus of claim 13 wherein the inflated airbag has a rear that is
15 adjacent the rider and a front that is spaced forwardly therefrom, and the plurality of
connections include connections that are generally disposed at the front and rear of
the airbag to restrict size of the inflated airbag therebetween.

15. The airbag apparatus of claim 14 wherein the front connection comprises a
20 pair of laterally spaced connections that generally restrict the size of the inflated
airbag in a lateral direction.

16. The airbag apparatus of claim 14 wherein the plurality of connections
includes a generally upper connection beyond which the airbag extends when
25 inflated.

17. The airbag apparatus of claim 13 including a retainer in which the airbag is
stowed and positioned to allow the airbag to inflate upwardly and forwardly and

rearwardly, and the predetermined positions of the connections between the control member and the airbag cause the predetermined direction to be in a generally upward direction so that size of the inflated airbag is maximized in the upward direction and restricted in a forward and rearward direction.

5

18. The airbag apparatus of claim 17 wherein the predetermined positions of the connections restrict size of the inflated airbag in a lateral direction transverse to the upward direction and the forward and rearward direction.

10 19. A method for manufacturing an airbag apparatus for a motorcycle, the method comprising:

providing an airbag; and
connecting at least one direction control member to the airbag such that inflation of the airbag is optimized in a predetermined direction for maximizing
15 protection of the rider in the event of front collisions with the motorcycle.

20. The method of claim 19 wherein at least one direction control member is connected to the airbag by connecting generally opposing portions of the airbag with at least one tether so that the tether is extended with airbag inflation and the
20 extended tether restricts inflation size of the airbag between the generally opposing portions.